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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/570,827	03/06/2006	Kew-Ho Lee	930086-2023	7701

7590 04/10/2009
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EXAMINER

ANGADI, MAKI A

ART UNIT	PAPER NUMBER
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1792

MAIL DATE	DELIVERY MODE
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04/10/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/570,827	Applicant(s) LEE ET AL.	
	Examiner MAKI A. ANGADI	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☒ Claim(s) 6-8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/15/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1-4 are rejected under 35 U.S.C. 103(a) over Zhang et al. (US Patent No. 5,468,699) in view of Webster et al. (US Patent No. 5,269,926) and Najjar et al. (US Patent No. 5,160,352).

As to claims 1-3, Zhang discloses a method of preparing a titanium oxide (titania) composite membrane that includes zeolite molecular sieve (col.1, lines 59-67) for separating water/alcohol mixture (col.5, lines 20-26), the method comprising the steps of: (a) modifying macropores between 1 and 250 microns

Art Unit: 1792

by sequentially treating the macropores (col.5, lines 60-63, col.6, lines 1-7) (b) forming a titania surface layer according to a sol-gel process (col.1, line 65) by coating modified porous surface with titania sol (col.5, lines 64-66, col.6, lines 7-12).

Zhang discloses drying membrane between 400°C and 500°C (col.6, lines 3-6) but does not explicitly disclose the process of calcining the membrane. However, Najjar discloses the process of drying excess liquid by drying in the temperature of 20-60°C followed by calcining at 400°C (col.4, lines 52-55). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to employ drying and calcining for preparing titania membrane because Najjar illustrates that drying and calcining would minimize cracking and deterioration of titania membrane (col.6, lines 38-40).

Zhang is silent about the process of treating the macropores with silica xerogel and gamma-alumina.

However, Webster discloses the process of forming microporous membrane on a porous substrate with silica xerogel (col.8, lines 4-5, col.2, lines 27-37) and gamma-alumina support (col.9, lines 40-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to treat macropore and or micropores with silica xerogel and gamma alumina because Webster illustrates that the use of xerogel and gamma alumina leads to construction of microporous metal oxide ceramic

Art Unit: 1792

membrane for critical filtration operations such as ultrafiltration (col.2, lines 38-42).

As to claim 4, Zhang discloses the process titania sol prepared by tetraalkoxide in a mixture of water, hydrochloric acid (col.4, lines 34-37, col.5, lines 38-44) and alcohol (col.5, lines 20-25).

Claim Rejections - 35 USC § 103

2. Claims 3 and 5 is rejected under 35 U.S.C. 103(a) over Zhang et al. (US Patent No. 5,468,699) in view of Webster et al. (US Patent No. 5,269,926) and Najjar et al. (US Patent No. 5,160,352) as applied to claim 1 above, in further view of Sundet (US Patent No. 4,520,044).

Zhang is silent about the use of soaking and rolling process in the preparation of composite membrane. However, Sundet discloses the process quenching or soaking in an aqueous solution (col.1, lines 61-65) and rolling the excess solution (col.2, lines 13-15). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to select soaking-rolling process because Sundet illustrates that soaking and rolling help to remove excess solution from the substrate (col.2, lines 13-14).

Allowable Subject Matter

3. Claims 6-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The closest prior art of Zhang (US Patent No. 5,468,699) fails to disclose titania composite membrane with pore size of 1-2 nm having surface area, permeability for water and selectivity for water/alcohol mixture in the range cited in the claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Anderson et al. (US Patent No. 5,208,190) discloses microporous alumina ceramic membrane.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MAKI A. ANGADI whose telephone number is (571)272-8213. The examiner can normally be reached on 8 AM to 4.30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G. Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information

Art Unit: 1792

for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Maki A Angadi/
Examiner, Art Unit 1792

/Shamim Ahmed/
Primary Examiner, Art Unit 1792